

### ABSTRACT

Fuel cells are described and contain a gas diffusion electrode, a gas diffusion counter-electrode, an electrolyte membrane located between the electrode and counter-electrode. The electrode or counter-electrode or both contain at least one modified carbon product. The electrolyte membrane can also or alternatively contain modified carbon products as well. The modified carbon product is a carbon product having attached at least one organic group. Preferably the organic group is a proton conducting group and/or an electron conducting group. The present invention preferably permits the elimination of fluoropolymer binder in the active or catalyst layer and further preferably leads to a thinner active layer and/or a thinner electrolyte membrane. Other uses and advantages are also described.